REMARKS

The Applicants request reconsideration of the rejection.

Claims 24, 26, and 28 are pending.

Claims 24-28 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. The claims have been amended to change "bias voltage" to --voltage-- to avoid any confusion regarding this term.

Claims 24 and 27 were rejected under 35 U.S.C. § 102(b) as being anticipated by Arnett et al U.S. Patent No. 5,049,461 (Arnett). Claims 25, 26, and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Arnett in view of Kuroda et al U.S. Patent No. 5,546,374 (Kuroda).

The Applicants have added the subject matter of claims 25 and 27 to independent claim 24, and have amended independent claim 28 to clarify that the tip for exposing/irradiating the resist layer with electrons performs these steps while in contact with the resist layer. The Applicants refer the Examiner to the specification at page 16, lines 11-18, for support ("Due to the Coulomb force, the respective springs 22b and 22c are bent or deformed and the respective tips are held in contact with the resist layer 11."). The purpose of holding the tip in contact with the resist layer is to prevent

breakage of the tip due to the Coulomb force just mentioned. In particular, the Coulomb force abruptly acts on the tip when the voltage is applied thereto, so that the respective spring is suddenly deformed, resulting in a high possibility that the tip will hit against the resist layer 11, breaking it. See the passage just noted in the specification.

In contrast, the primary reference to Arnett is directed to a method of making and using a high resolution lithographic mask in which a tunneling current is maintained through feedback to maintain the distance between the tip and surface of the film under exposure. By design, Arnett requires that the tip not contact the film 16 on the conductor substrate 17.

The Examiner recognizes that Arnett does not disclose that the tip is in contact with the film. The Examiner cites the secondary reference Kuroda as disclosing this feature. However, the Kuroda method and apparatus requires contact between a recording tip and recording medium for the purpose of forming recording bits. The recording is performed by locally oxidizing the surface of the recording medium using an electric current locally flowing between the probe tip and the recording medium upon application of a voltage through the probe. Column 3, lines 17-21. The local oxidation occurs due to Joule heating as a result of the electric current flowing

through the probe tip. In particular, the local oxidation is performed, under Joule heating, by requiring the recording medium surface to take in more oxygen from the atmosphere, thus increasing the film thickness of the oxide layer 104 (or by taking oxygen from a water "layer" 204 adsorbed on the surface of the recording medium, by anodic oxidation), thus forming the recording bits. Kuroda is not directed to exposing or irradiating a resist layer to form/not form latent images in the resist layer.

Accordingly, neither Arnett nor Kuroda teaches the feature of exposing a resist layer with electrons from the tip by supplying a first voltage between the tip and substrate for those portions of the resist layer in which latent images are formed, and irradiating the resist layer with electrons from the tip by supplying a second, lower voltage between the tip and substrate for those portions of the resist layer in which latent images are not formed, wherein the tip is in contact with the resist layer during the exposure according to the first voltage and irradiation according to the second voltage.

Moreover, Arnett does not use or consider Coulomb force in the mask manufacture or use, as required by the apparatus of claim 28. The Applicants do not argue that a Coulomb force might affect the first holder described by Arnett, but any

such Coulomb force is insubstantial in effect in Arnett because Arnett's tip 12 is controlled by the scanning tunneling microscope (STM) method. In fact, it appears that, by maintaining the tunneling current distance between the tip and substrate, Arnett is clear of the effect of any Coulomb force acting on the first holder.

Furthermore, the person of ordinary skill is not taught to modify the method of making and using a high resolution lithographic mask according to Arnett by the teachings of recording and/or reproducing according to Kuroda. The Kuroda techniques are entirely directed to forming recording bits as projections by the local oxidation of a recording medium surface, as mentioned above. Thus, Kuroda is directed to a different inventive field than that of Arnett (or the present invention). Furthermore, because Arnett expressly requires the tip to be maintained at a tunneling current distance from the surface, Arnett teaches away from any application of the Kuroda contact. In addition, no aspect of Arnett requires the formation or reproduction of recording bits in the mask or in the semiconductor device manufactured using the mask of Arnett. For these reasons as well, Arnett and Kuroda cannot be said to render the claimed invention obvious.

In view of the foregoing amendments and remarks, the Applicants request reconsideration of the rejection and allowance of the claims.

Respectfully submitted,

Daniel J. Stanger
Registration No. 32,846
Attorney for Applicants

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Road, Suite 370
Alexandria, Virginia 22314
Telephone: (703) 684-1120
Facsimile: (703) 684-1157
Date: October 22, 2003